

Multiple conserved regulatory domains promote Fezf2 expression in the developing cerebral cortex.

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Public Summary:

Scientific Abstract:

BACKGROUND: The genetic programs required for development of the cerebral cortex are under intense investigation. However, non-coding DNA elements that control the expression of developmentally important genes remain poorly defined. Here we investigate the regulation of Fezf2, a transcription factor that is necessary for the generation of deep-layer cortical projection neurons. **RESULTS:** Using a combination of chromatin immunoprecipitation followed by high throughput sequencing (ChIP-seq) we mapped the binding of four deep-layer-enriched transcription factors previously shown to be important for cortical development. Building upon this we characterized the activity of three regulatory regions around the Fezf2 locus at multiple stages throughout corticogenesis. We identified a promoter that was sufficient for expression in the cerebral cortex, and enhancers that drove reporter gene expression in distinct forebrain domains, including progenitor cells and cortical projection neurons. **CONCLUSIONS:** These results provide insight into the regulatory logic controlling Fezf2 expression and further the understanding of how multiple non-coding regulatory domains can collaborate to control gene expression in vivo.

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